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ABSTRACT

This nationwide survey of mathematics education professors presents and discusses rankings of mathematics education doctoral programs, tabulations of the number of doctoral dissertations produced in various programs, and the correlations between these two sets of data. Georgia, Ohio State, and Wisconsin were each mentioned by over 90% of the respondents and stand out as the most respected doctoral programs. There is a weak positive correlation (approximately .2) between the perceived quality of a program and the number of dissertations produced. (Author)

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A Survey of Doctoral Programs in Mathematics Education

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SE 034 912

Abstract

This nationwide survey of mathematics education professors presents and discusses rankings of mathematics education doctoral programs, tabulations of the number of doctoral dissertations produced in various programs, and the correlations between these two sets of data.

Georgia, Ohio State, and Wisconsin were each mentioned by over 90% of the respondents and stand out as the most respected doctoral programs. There is a weak positive correlation ($\approx .2$) between the perceived quality of a program and the number of dissertations produced.

A Survey of Doctoral Programs in Mathematics Education

Descriptions of some mathematics education programs have been compiled (Crosswhite, 1973), and national surveys have ranked graduate mathematics programs (Roose, 1970; Ladd, 1977), but these studies have not identified stronger mathematics education programs. Some universities who have strong mathematics and education departments do not offer doctoral degrees in mathematics education (Stanford, Harvard), while some of the major mathematics education doctoral programs exist in universities which are unranked in the Ladd survey (Georgia, Maryland, Purdue, Florida State).

These survey results will give professors, administrators, and prospective graduate students information about the perceived relative quality of doctoral programs in mathematics education in the United States. This survey includes two sets of data: rankings of mathematics education doctoral programs by mathematics education professors and tabulations of doctoral dissertations produced in various programs.

Data Collection

The survey was distributed to 110 mathematics education professors in the fall of 1979 with a follow-up mailing in February, 1980. The survey used criteria to select a representative group of professors involved in writing textbooks and articles, conducting research, and speaking at national meetings. Professors from all the major doctoral programs were surveyed. For details, see Appendices A and B.

These professors were asked to "rate the top 10 (or any number less than 10) doctoral programs in mathematics education in the United States. This should be a rating of the overall quality of the mathematics educcation program which considers the quality of the faculty, the quality of the graduate students, the accessibility of the faculty, and the facilities of the institution. Rate the schools any way you wish (e.g.-1,2,3,4,5,6,7,8,9,10 or 1,1,3,3,3,6,7,8,8,10 or an unranked group.) Do not vote for your own department."

Data Analysis

The response rates are reported in table 1.

TABLE 1

Programs received points on the basis of rankings on each survey (10 points for a #1 ranking, 9 points for a #2 ranking, and so on down to 1 point for a #10 ranking). 38 doctoral programs received votes. The 19 programs averaging .5 points or higher per survey are ranked in table 2.

TABLE 2

In order to judge whether the survey's association with the University of Maryland biased the results, alternate return addresses were used. The University of Maryland averaged 3.35 for 41 surveys which were returned to Florida and New York addresses and 3.19 for the 21 survey returned directly to the University

of Maryland. A T test reveals no statistically significant difference in the two ratings.

To see if programs producing more dissertations were rated more highly, the data in table 3 was compiled. All programs producing an average of 2 or more dissertations per year for a 3 year period are listed in table 3. The correlation between the average points per survey and the number of surveys produced is about .2.

TABLE 3

Discussion

Several challenges could be made to this study. A few respondents suggested that the study is biased in favor of larger programs because more professors tend to hear about them. The weak correlation ($\approx .2$) between the number of dissertations produced and the survey point averages (table 3) seems to counter this claim. However, it seems likely that some excellent small programs were overlooked by some of the raters.

Other participants suggested that professors voting for their alma maters would bias the results although it could be argued that they are especially well-qualified to rate their alma maters. The rankings excluding such votes are unchanged except for Columbia dropping below Chicago and Northwestern, and Arizona State dropping below California (see table 2). Texas, Indiana, and Wisconsin also show some decline

in their averages. Overall, only minor changes would occur if a professor were not allowed to vote for his alma mater.

Another challenge concerns the fact that many respondents ranked programs primarily on the basis of what professors are at those universities. The quality of the faculty is closely related to the quality of the doctoral program. Faculty members often teach courses related to their research specialties and new dissertations are often related to these faculty research interests. It seems reasonable to use a knowledge of faculty members as a principal means of ranking mathematics education programs. However, it is difficult to specify exactly what criteria should be used to rank programs. Survey respondents had to determine their own specific criteria.

Conclusions

A number of conclusions can be drawn from the data presented. According to table 2, Georgia, Ohio State, and Wisconsin are recognized by nearly everyone as having strong mathematics education programs. A Tukey procedure indicates that the programs ranked 4-9 (Maryland, Michigan, Indiana, Purdue, Florida State, and Texas) were distinguished in varying degrees from those ranked 10-19 (Columbia, Chicago, Northwestern, Illinois, Minnesota, Iowa, SUNY-Buffalo, Arizona State, California, and New York). The programs rated 10-19 are not significantly

different in rank.

There is a weak positive correlation between the perceived quality of a program and the number of dissertations produced. This weak correlation probably results from the relative difficulty of obtaining a dissertation, the location of a school, the size of a program, and the quality of a program. About 30% of all mathematics education dissertations come from programs which received no votes in the survey. Perhaps this survey will influence more prospective graduate students to choose stronger programs.

This survey represents the first serious attempt to inform people about the perceived relative quality of mathematics education doctoral programs around the United States. Prospective graduate students can use these results along with considerations such as the location of the school and the unique individuals who conduct the various programs. The survey will also make university education professors and administrators more aware of some of the leading graduate programs in mathematics education.

Table 1

Response Rates

Groups	Number Surveyed	Number Responding	Number Rating Programs
Professors	110	75 (68%)	67 (61%)
Institutions	56	49 (88%)	45 (80%)

Table 2

Rank Ordering of Mathematics Education Doctoral Programs

University	Average Points Per Survey[a]	Number of Raters Receiving PhD from	Average Points Per Survey Excluding Votes for Alma Mater
1. Georgia (Athens)	7.81	2	7.81
2. Ohio State	7.32	4	7.33
3. Wisconsin (Madison)	7.02	5	6.86
4. Maryland (College Park)	3.30	2	3.28
5. Michigan (Ann Arbor)	3.01	2	3.01
6. Indiana (Bloomington)	2.43	5	2.27
7. Purdue	2.03	0	2.03
8. Florida State	1.90	2	1.93
9. Texas (Austin)	1.84	3	1.53
10. Columbia	1.50	3	1.312
11. Chicago	1.44	0	1.44
12. Northwestern	1.31	0	1.313
13. Illinois (Urbana)	1.23	3	1.21
14. Minnesota (Miineapolis)	1.11	0	1.11
15. Iowa (Iowa City)	.76	2	.73
16. SUNY-Buffalo	.67	0	.67
17. Arizona State	.62	1	.52
18. California (Berkely)	.53	0	.53
19. New York	.51	2	.48

Note. Other doctoral programs receiving votes (in descending order): Missouri (Columbia), South Florida, Connecticut (Storrs), Tennessee, Kent State, Oregon, Southern Illinois, Florida, Penn State[b], Pittsburgh[b], Oklahoma State[c], Temple[c], Colorado[c], Virginia[d], Kansas State[d], Houston, North Carolina State, Ohio, Pennsylvania.

Programs received 10 points for a #1 ranking, 9 points for a #2 ranking and so on down to 1 point for a #10 ranking. Programs received 0 points for each rater who chose not to list them. Raters could not vote for their own university.

[a]programs averaging .5 or higher per survey are listed

[b]tied in ranking

[c]tied in ranking

[d]tied in ranking

Table 3

Rank Ordering of Dissertations Produced Compared to Survey Ranking

University	Number of Dissertations[a]	Survey Ranking[b]
1. Columbia	24	10
2. Texas	16	9
3. Georgia State	15	*
4. New York	13	19
5. Indiana	10	6
5. Florida State	10	8
7. Maryland	9	4
7. Auburn	9	*
9. Minnesota	8	14
9. Rutgers	8	*
9. Northern Colorado	8	*
12. Georgia	7	1
12. Ohio State	7	2
12. Tennessee	7	23
12. Pittsburgh	7	28
12. Houston	7	35
17. SUNY-Buffalo	6	16
17. Connecticut	6	22
17. St. Louis	6	*

Table 3 (Continued)

[a]compiled from DAI mathematics education listings from November, 1977 to October, 1980. Each abstract was analyzed by topic, university and adviser to determine if it should be counted. Schools which average 2 or more dissertations per year are listed.

[b]from table 2

*unranked in the survey

References

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Crosswhite, F. Joe and McIntosh, Jerry A.. A Survey of Doctoral Programs in Mathematics Education. Columbus, Ohio: ERIC Information Center, 1973.

Ladd, Everett and Lipset, Seymour. "How Professors Rate Faculties in 19 Fields." Chronicle of Higher Education, 1979, 17, 6-7.

Roose, Kenneth and Andersen, Charles. A Rating of Graduate Programs. Washington D.C.: American Council on Education, 1970.

Appendix A: Selecting Survey Participants

The 110 mathematics education professors who were surveyed were chosen by one of the following 2 sets of criteria:

I. He or she is a professor at a school which has produced at least one mathematics education dissertation in the last 3 years (according to the July listings of JRME for 1977-9) and meets at least 2 of the following criteria A-D:

A. The professor was scheduled to speak at the 1978 or 1979 national NCTM convention.

B. The professor had an article published in the Mathematics Teacher, Arithmetic Teacher, School Science and Mathematics, or Journal for Research in Mathematics Education during the last 12 months (11-78 through 10-79) or was a member of the editorial boards of one of these journals as of 10-79.

C. The professor published a book which was reviewed in any one of the journals included in B from 11-78 to 10-79.

D. The professor is listed in the February 1979 directory as a member of the special interest research group in mathematics education research.

II. Every university having a doctoral program which is rated by a respondent in the top 10 must have at least one of its professors surveyed. If none of the professors meets 2 of the requirements IA-ID, one professor who met one of the requirements IA-ID was surveyed.

In this survey, 98 professors are in category I and 12 are in category II.

Appendix B: Survey Participants*

Douglas Aichele
Robert Ashlock
Glenn Allinger
Max Bell
Gary Bitter
Tom Brieske
Stephen Brown
Patricia Campbell
Robert Clark
Marty Cohen
Arthur Coxford
F. Joe Crosswhite
Neil Davidson
Donald Dessart
Kenneth Easterday
Jon Engelhardt
James Fejfar
James Fey
Janice Flake
William Geeslin
E. Glenadine Gibb
Vincent Glennon
John Gregory
Douglas Grouws
John Harvey
David Hayes
James Heddens
Ralph Heimer
Christian Hirsch
Roland Hughes
Linda Jensen
Martin Johnson
Hiram Johnston
Margeret Kenney
Dan Knifong
Gerald Kulm
Charles Lamb
John LeBlanc
Frank Lester
Robert McGinty
Ruth Ann Meyer
James Moser
Rebecca Nelson
David O'Neil
Len Pikaart
Tom Post
Robert Reys
Gerald Rising
Barbara Sadowski
Joseph Scandura
Janet Scheer
Harold Schoen
Lehi Smith
H. E. Speece
Marilyn Suydam
Marc Swadener
Carol Thornton
Kenneth Travers
Harold Trimble
Ed Uprichard
Norman Webb
Stephen Willoughby

*6 participants chose not have their names listed.

Appendix C: Rank Ordering of Groups of Schools

Group	Schools
I	Georgia, Ohio State, Wisconsin
II	Maryland, Michigan, Indiana
III	Michigan, Indiana, Purdue, Florida State
IV	Indiana, Purdue, Florida State, Texas, Columbia, Chicago, Northwestern, Illinois
V	Purdue, Florida State, Texas, Columbia, Chicago, Nothwestern, Illinois, Minnesota
VI	Florida State, Texas, Columbia, Chicago, Northwestern, Illinois, Minnesota, Iowa, SUNY-Buffalo
VII	Texas, Columbia, Chicago, Northwestern, Illinois, Minnesota, Iowa, SUNY-Buffalo, Arizona State
VIII	Columbia, Chicago, Northwestern, Illinois, Minnesota, Iowa, SUNY-Buffalo, Arizona State, California, New York

Note. Schools within each group are not statistically different from one another in rank using the Tukey A ($\alpha = .05$).